THE ALLEGED REFLEX CAUSES OF NERVOUS DISEASE.

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IF Sir Thomas Browne were to return to this world, he might add to a new edition of the *Pseudodoxia Epidemica* an interesting chapter on reflex neuroses. He could begin by recalling the opinions which obtained in his own day concerning the causes of melancholy—which, by the way, seem to have served the same useful purpose of a term to conceal diagnostic ignorance that debility does to-day—how "There is almost no part of the body which, being distempered, doth not cause this malady, as the brain and his parts, heart, liver, spleen, stomach, matrix, or womb, pylorus, myrach, mesentery, hypochondries, meseraic veins." He would, of course, mention the ascription of acute anterior poliomyelitis to teething, of paraplegia to disease of the urinary organs, and of spastic paraplegia to phimosis, and he could hardly fail to note the remarkable nervous symptoms still grudgingly attributed to intestinal worms. In his own day, however, scientific skeptic as he was, he testified as an expert before Sir Matthew Hale, that he was "clearly of opinion that the persons [on trial] were bewitched," so that it would be too early to expect him to hold that the opinion that ascribes various neuroses to eyestrain or even to pelvic disease was false.

In order definitely to determine whether the doctrine of reflex neurosis is one which can be accepted, we must first define it. It may be fairly stated, I think, in this way: A slight change occurs in some organ, not sufficient to attract particular attention to the organ itself, to interfere materially with its functions, or to cause noticeable pain or discomfort in it. This change irritates the terminal sensory nerves of the affected organ, and the irritation is communicated to connecting fibres of the ganglionic or spinal nerves, and thus conveyed to a distant organ which may be anatomically healthy. This irritation may excite in the distant organ phenomena which simulate a morbid condition in it, the organ responding "most violently to this slight abnormity, as the alarm-gong sounds in answer to the tap on the button of the distant station."[2]

This doctrine, in former times, received very much support from the cases of nervous disorder—epilepsy, insanity, etc.—which were supposed to be due to pelvic disease, and were promptly cured by treatment of the pelvic disorder after all other methods of treatment had failed. We

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[1] Read before the Philadelphia Neurological Society, January 28, 1895.

[2] Engelmann: The hystero-neuroses. Mann's System of Gynæcology, ii. 59.

have all of us heard how the gynecologist has seen "an agonizing asthma cease shortly after the placing of a pessary, intense cardiac pains and insomnia vanish upon the insertion of a tampon, and a single application of electricity cause a violent dyspnœa, with great nervous depression, to disappear, even during the application, whilst the patient was still upon the table, though haunted by suffering and reduced to invalidism for over two years. . . . Even violent psychoses, such as mania, melancholia and epilepsy, will disappear completely upon relief of the uterine lesion."[1]

Few of us, however, have met with such cases in our own practice, and they seem to be growing much rarer. In my own experience I do not recall a case where the nervous condition was materially benefited by treatment of the pelvic organs unless there were definite local symptoms of pelvic disease; and even with actual local disease the treatment of the nervous conditions may greatly relieve the local symptoms.

It is not in accordance with the good Anglo-Saxon spirit of fair play to kick a man when he is down, so that it is not necessary to say very much of the "meddlesome gynecology" which has done so much harm in the past. When in the discussion before the Association of American Physicians in 1891, where the neurological side was so ably sustained by your President, Dr. Lusk could say that he was "tempted to assert that the performance of normal ovariotomy for epilepsy and insanity is to be regarded as hardly better than malpractice," we may conclude that that operation is following the course of the "star of empire," and is seldom performed in our Eastern cities. The admirable pleading of the late Dr. Goodell, too, has done much to teach the gynecologist that a woman has "some organs outside of the pelvis," and yet we still see the evil effects of a constant tinkering at the pelvic organs by men who ignore the rest of the body. It is within a very short time that a young girl came under my care, who had always been weak and neurotic, and who had broken down nervously from anxiety concerning an invalid mother, over-study and over-excitement, and an entire neglect of the necessity of rest. Just at the beginning of her breaking down slight leucorrhœa, without any other special pelvic symptoms, led her physician to ignore all the important elements in the causation of her trouble and to suggest a vaginal examination. A "moral rape" was perpetrated, absolutely nothing abnormal was found in the pelvis, but the mental shock was most disastrous, and added greatly to the length of her illness. "Es ist eine alte Geschichte," but the moral of it has not yet been learned by the profession at large.

There are, of course, cases where the anæmia caused by extreme menorrhagia, the toxins absorbed from gonococcal infection or malignant disease, or the exhaustion which may follow the severe pains of dysmenorrhœa may give rise secondarily to nervous disease; but such cases are outside of the limits of our definition, and need not be discussed.

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[1] Engelmann. Loc. cit., p. 60.

There are many reasons why this doctrine of reflex neuroses, now, so far as pelvic diseases go, decadent, should have won favor. If, in an obstinate case of nervous exhaustion or hysteria, or in a grave case of epilepsy or melancholia, we could find a cause for all the trouble in a slight lesion of a distant organ, and, by curing or removing that lesion, cure the nervous trouble, it would certainly be worth the attempt. Such a cure, too, would speak loudly for the acumen of the physician who exercises it, and naturally every physician would gladly win such fame; so that, when a new source for a reflex neurosis is advocated, we find a host of men, who know less than they ought of nervous diseases, ready to attribute all the affections which they cannot explain to this cause.

One reason for the persistence of this doctrine is the failure of the physician to comprehend the various morbid conditions manifested in hysteria and neurasthenia. There are many women, and not a few men, who are always in a state of unstable nervous equilibrium. They have, perhaps, a scanty supply of nervous force, which enables them to get through an ordinary day without any great difficulty; but they have no reserve of force. Any trifling accident, menstruation, coryza, a spoonful too much of salad, a cup of coffee, an unfortunate investment, a quarrel with the cook, or an unbecoming bonnet, will lead to a temporary nervous bankruptcy which excites some sort of a nervous storm—indigestion, insomnia, neuralgia, a fit of the blues, or an hysterical outburst. Not recognizing their own weak condition, the trouble is referred to the immediate exciting cause, which in their own minds, and often in the mind of the physician, is thus brought into undeserved prominence. An example of this is shown in certain cases of epilepsy, where, as was very clearly shown by Herter and Smith,[1] the individual attacks often coincide with increased gastro-intestinal putrefaction and constipation. It can hardly be assumed that such intestinal disturbances are peculiar to epileptics, so that another factor must also be considered, and that is, of course, the defective brain of the epileptic which can be so easily disturbed by such processes.

Again, the study of hysteria shows us that it is not uncommon to find in the hysterical certain painful points. These points are often situated over the ovaries, to be sure; but they are also frequently found elsewhere: over certain vertebræ, in the epigastrium, beneath the breasts, under the clavicles, or somewhere in the head. We know that the tenderness is purely of psychical origin, that it may occur without any reference to the condition of the organ which lies beneath the tender spot, or which may seem tender itself. Sometimes these tender spots are hysterogenous, and pressure on them may give rise to an hysterical attack. Sometimes the morbid psychical condition may directly affect certain remote organs, and we have hysterical aphonia, hysterical vomiting, or hysterical anuria. Careful study will show in such cases that the whole trouble is purely psychical, and that under hypnotic influences the organ can perform its functions normally. The characteristic of such patients is their profound suggestibility. Either by their own or by another's suggestion, some idea assumes a dominating place in their consciousness, or, perhaps unknown to them, in their subconsciousness, and the morbid psychical processes thus set in motion give rise to many very strange and remarkable symptoms. We know only too well how the "indiscreet youth" are led by the quacks to develop a long series of "imaginary" but none the less real and distressing sexual symptoms, which may be most difficult to cure. The sexual element plays a most important part in the psychical life of woman, which need not be dwelt upon here, so that the idea of "womb trouble" is fraught with every form of evil and disaster, and a woman finds plenty of evidence, not only from the "astringent smile" of her friend "for health," but from eminent medical authority, that all her vapors and megrims can be explained by this dreaded disorder. The suggestion of pelvic treatment may for a time relieve all these ills, and, in certain hysterical conditions, a tent, a tampon, an application, or a pessary may work wonders. The still more tremendous suggestion of a surgical operation can do still more, and an incision of the skin of the abdomen, or normal ovariotomy, may, for a time, work a startling cure.

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[1] New York Medical Journal, Aug. and Sept. 1892.

Such cures, as I have said, are not always permanent, and here, as elsewhere, the argument *post hoc, ergo propter hoc* often leads to false conclusions. Many chronic affections, notably tabes and epilepsy, may do well for a time under any new form of treatment, and the whole history of the treatment of epilepsy is filled with the story of the abandonment of therapeutic measures which at first had warm advocates. Castration, trephining (in non-traumatic cases), ligature of the vertebrals, nitrate of silver, and zinc, in the treatment of epilepsy, are like the last year's snow. A young woman with a very neurotic history was referred to me some time ago by an oculist. He clearly recognized the neuropathic element in her trouble, but as she suffered greatly from headache, which had been much aggravated by using her eyes in the study of music, he thought it fair to test the ocular conditions. He found anisometropia, and glasses gave striking relief for a month; then the trouble returned, and again he examined the eyes and corrected the errors anew. This again gave relief for a time. So the story went on for two years. The actual condition of the eyes and their muscles did not seem constant, but he worked with the utmost skill and patience to remove every element of eyestrain. Each attempt met with less and less success, until finally the girl fell back into her old condition.

In all these cases the trouble is something more than a misplaced womb or a diverted nasal septum, or half a dioptre of hypermetropia, or an exophoria. It is the bad brain beneath, the neuropathic state indicative of more or less degeneracy. That, however, is a truth which is not pleasant for the physician to tell or for the patient to hear. We know how eager the patient and his friends are to have some cause outside of himself assigned to his trouble. A fall in childhood, eyestrain, masturbation, the effects of some infectious disease—anything is better than to face the fact that the patient is degenerate, and that his trouble is due to the degeneracy of his ancestors. The doctrine of a reflex neurosis is much more popular—it is hard to own to a bad brain. "Daher man es viel besser ertragen kann, sein Missgeschick, als sein Ungeschick deutlich ins Auge zu fassen."

There is, however, a real condition which gives the hypothesis of reflex neurosis a certain support, and that is the condition of referred pain. It has long been known that disease in a certain part might give rise to pain in a somewhat distant part of the body, as when hip disease causes pain apparently in the knee. This can hardly be called a true reflex in every case, for it is often due to a mistaken interpretation of the sensations which reach the brain, just as when the man who has had his hand amputated still thinks that he feels his fingers. Dana,[1] some years ago, pointed out some of the more important relations of these referred pains. His researches have since been confirmed by Heads,[2] who has made an elaborate and exhaustive study of all the forms of referred pain and tenderness, and has done much to put our knowledge of the subject upon an accurate foundation. It seems probable, however, that this reference of pain and tenderness always follows a certain definite course, being governed by the anatomical relations of the parts. Thus, the referred pain of hip disease, already spoken of, is always ascribed to the knee, and never to the sacrum or pubes. Head has found that the referred pain and tenderness in disease of the stomach are ascribed to the skin area supplied by the sixth, seventh, eighth, and ninth dorsal segments, which also send motor fibres to the stomach. In diseases of many of the viscera there may also be referred pain and tenderness in certain areas of the head, these areas being probably in anatomical connection with the organs by means of the fifth nerve and its nucleus and the nucleus of the pneumogastric. It is obvious that if the local disease be cured by the appropriate treatment, the referred pain and tenderness will cease; and also that if the local disease be neglected, the referred pain and tenderness will continue; and that, secondarily, they may cause phenomena of exhaustion, with their consequent nervous symptoms. It is necessary, therefore, carefully to examine every individual case in order to determine if there be a local source for any referred pain; but it is probable, even in the light of our present knowledge, that, given the location of such pain, we can draw fairly accurate conclusions as to its source. Pain in the knee in a child, for instance, instantly suggests hip disease. Occipital pain may well suggest ovarian disease, while if occipital pain be absent and the pain be frontal, we may, according to Head's rules, infer that the ovaries are not responsible. In such cases, however, we have to do only with referred pain and tenderness, and not with any other nervous phenomena.

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[1] New York Medical Journal, July 23, 30, 1887.

[2] Brain, 1893-1894, xvi. 1; xvii. 339.

Granting that the hypothesis of reflex neuroses, as stated in the beginning of this paper, be sound, there are certain very remarkable peculiarities which remain to be explained. Why, for example, should disease of the ovary cause so much more nervous trouble, and so much oftener demand removal of the organ on account of the nervous trouble, than disease of the testicle, which has similar anatomical nervous relations? Why should an inflammation of the mucous membrane of the cervix uteri cause so much more nervous disturbance than a gleet? Why is the whole notion of reflex neuroses from uterine disease to-day decadent, while the doctrine of reflex neuroses from eyestrain is dominant? Why are the reflex neuroses from diseases of the nose coming into prominence, while the reflex neuroses from diseases of the larynx are seldom mentioned? Why do we so seldom hear of reflex nervous troubles from diseases of the joints? In all these cases there is equal reason to suppose an irritation of terminal sensory nerves, and in all these cases there is a communication between these nerves and other ganglionic or spinal nerves which can convey the irritation to a distant organ.

I have just spoken of the doctrine of reflex neuroses from eyestrain. As the subject, especially since the work of Stevens, has attracted much attention in this country, although comparatively little abroad, it may be well to consider it briefly.

Given a moderate error of refraction in the form of hypermetropia or astigmatism, or given insufficiency of some of the external muscles of the eye, it may be compensated by unusual effort of the muscles of accommodation or of the external muscle at fault. This unusual effort gives rise to the ordinary result of any unusual muscular effort—fatigue, a heavy feeling, and pain. Weir Mitchell long ago pointed out the influence of errors of refraction in causing headache, and cases of headache from this cause are met with daily by all of us. Like most neurologists, I have made it almost a routine practice to refer all patients with obstinate headache to an oculist, and often with satisfactory results. Unfortunately, however, even when an error of refraction or a muscular insufficiency is present, the treatment of the ocular condition does not inevitably lead to a cure, and I have more than once had to regret my rash promise of relief after I had urged a pretty woman to wear the obnoxious glasses. Cases such as I have just cited, where every form of ocular treatment gave only temporary benefit, have not been unique in my experience, and it has sometimes happened, even where there was astigmatism or hypermetropia, that ocular treatment did no good at all. A young woman of twenty-five years began to have severe pain in the vertex and right side of the head after an attack of pleurisy with effusion, for which she was tapped. The pain was dull and heavy, and she had a marked sense of pressure in the vertex, as if something were moving there and causing stagnation. She slept poorly and was nervous and despondent, and her memory was poor. The vision was blurred, and there was considerable sweating of the head. She consulted a neurologist, who at once referred her to an oculist, who found a slight astigmatism and gave her the proper glasses. Near work, however, had never brought on or exaggerated the pain, and the glasses did no good.

Such cases have led me to the belief that only when the pain was distinctly over the eyes, and was brought on or exaggerated by accommodation for near objects, and where there was no neurotic history, could a reasonable promise be given that glasses would relieve the headache. These headaches from errors of refraction, in other words, are nothing more than cases of referred pain. Head has defined the region of pain and tenderness more exactly as lying in the midorbital region, and he also adds that the pain comes on as soon as the patient wakes in the morning, and is relieved by complete paralysis of the accommodation by atropine.

In a few cases of blepharospasm and habit-spasm affecting the muscles about the eye a correction of errors of refraction has given marked relief; in other cases, however, such correction has been of no avail. In most cases where there has been relief, in my experiences, there has been a marked neurotic condition, and the trouble may have been of hysterical origin. It is possible, however, that with the extreme muscular effort at accommodation there may have been an overflow of nervous energy to the neighboring muscles.

Stevens, however, and various writers since, have urged that eyestrain from errors of refraction was of much importance in the production of epilepsy, chorea, and other nervous affections. For a year I referred every case of chorea to an oculist, who corrected all errors that required it. In a few cases the ocular treatment relieved the headache, but it had no perceptible effect on the chorea. I may add that I had no belief that treatment of the eyes would cure the chorea, but I referred them to the oculist at his request. To attribute a disease of limited duration, occurring chiefly in neurotic children, and coming on most frequently in the spring, often attended with fever, endocarditis, and arthritis, and probably of infectious origin—to attribute such a disease as this to a permanent cause like eyestrain—seems absurd.

Epilepsy, much more than chorea, is one of the diseases which rests most distinctly upon a neurotic basis. It is, in fact, an indication of pretty profound degeneracy. The recent work of Chaslin, Van Gieson, and others indicates very strongly that it has a definite anatomical basis in processes of neuroglia-sclerosis in the brain-cortex. In spite of the benefit which is alleged by Dodd, Ranney, and others, to follow treatment of the ocular conditions, it is asking too much to suppose that the degeneracy or the cortical changes are the result of astigmatism or any form of phoria.

It is probable that these errors of refraction upon which so much stress has been laid are very common in healthy persons, so that, unless it can be proved that they are much more common in nervous patients, their importance in the causation of nervous troubles is diminished. Concerning the frequency of hypermetropia and astigmatism there seems to be much difference of opinion. Ohlemann[1] found only 9 per cent. of hypermetropia in 293 gymnasium students at Minden, while Roosa[2] claims that the normal eye is becoming hypermetropic, and, in one hundred persons without asthenopia he found[3] only five who were wholly free from astigmatism. Hypermetropia, especially in children, seems, according to most observers, to be very common. There is some reason for believing astigmatism is commoner in epileptics. Dodd,[4] who in fifty healthy persons found 70 per cent. of hypermetropia and 16 per cent. of astigmatism, found in one hundred epileptics only 42 per cent. of hypermetropia and 42 per cent. of astigmatism. Féré and Vignes[5] found astigmatism in 112 out of 142 epileptics.

Granting this fact, however, it by no means follows that the astigmatism has any etiological influence on epilepsy. In epilepsy, as in other forms of nervous disease of degenerate type, various stigmata of degeneracy—cranial asymmetry, malformations of the ear, torus palatinus, anomalies of the genitals, etc.—are common. Astigmatism may itself be such a stigma, and the fact that in epileptics Féré has found astigmatism most marked on the same side as other physical deformities is certainly suggestive.

There is a class of cases, however, where a reflex origin seems fairly probable—the cases of so-called reflex epilepsy. A critical examination of the cases reported under this head would certainly eliminate many of them. A considerable number of them are undoubtedly cases of hysteria, and in others the dependence of the epilepsy upon the alleged source of irritation is certainly doubtful. Nevertheless the thesis that a remote irritation may give rise to convulsive seizures is supported by the well-known experiments of Brown-Séquard, producing epilepsy in the guinea-pig by injury of the sciatic, and by a limited number of authentic cases in man. In most of these cases the source of the epilepsy has been of traumatic origin, and on removal of the irritation the epilepsy has ceased. These cases, however, are distinctly rare. In the cases of epilepsy coming under my own observation, I think that less than 2 per cent. could be assigned to such a cause. One case is worth citing, although the patient was not long enough under observation for a complete report. A healthy Irishwoman, a multipara, had a difficult labor in which forceps were used. It was supposed that the forceps injured the sciatic nerve, as symptoms of lesion of the left sciatic soon developed. She came to the Boston City Hospital, where she remained for some weeks, suffering from sciatic pain, and slight anæsthesia, paresis, and degenerative reaction in the muscles in the region supplied by that nerve. After several months she returned, with some improvement in the sciatic symptoms, but complaining of loss of memory, mental dulness, general muscular weakness and slight tremor, and she reported several convulsive seizures. No special hysterical stigmata were found, but no opportunity occurred of seeing the attacks, and she failed to continue in attendance at the hospital.

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[1] Archiv f. Augenheilk., January, 1893.

[2] American Ophthalmol. and Otol., Oct. 1892.

[3] New York Medical Record, Nov. 26, 1892.

[4] Brain, 1893, xvi.

[5] Féré: Les Épilepsies et les Épileptiques, p. 393.

In these cases it is possible that the constant irritation of the sensory nerves, associated, perhaps, with the shock of an injury, may finally result in a motor discharge, giving rise to a pure reflex epilepsy. Such cases, however, are rare, and further investigation is necessary.

The following conclusions seem justified:

1. The essential feature in the production of many neuroses is the neuropathic state—the degeneracy of the subject.
2. In hysterical subjects suggestion plays an important part both in the development and in the cure of the symptoms.
3. Disease of any organ may give rise to referred pain in some definite area, but not to other nervous disturbances, except as a secondary result of local disease of the organ. This local disease manifests itself by the ordinary local symptoms, and the nervous phenomena are due to exhaustion, anæmia, intoxications, etc.
4. In a few rare cases injury of a sensory nerve may give rise to epileptiform seizures.
5. Surgical operations for the relief of nervous symptoms should never be performed unless there are clear indications, apart from such symptoms, for an operation.